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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/024,581	12/21/2001	Hiroki Takeuchi	046103-5008	2484

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EXAMINER

LAM, CATHY FONG FONG

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 09/30/2002

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/024,581

Applicant(s)

TAKEUCHI ET AL.

Examiner

Cathy Lam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3-11-02 are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Claim Rejections - 35 USC § 112

1. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is vague and indefinite as to what "tanδ" is referring to? Furthermore, it is vague and indefinite as to what "an embedding resin" is referring to? See Ex parte Slob 157 USPQ 172.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims, 1, 3-5 rejected under 35 U.S.C. 102(b) as being clearly anticipated by Howard (US 5589714).

Howard discloses a semiconductor device which is encapsulated (or embedded) in a thermosetting resin (col 2 L 19-22).

The thermosetting resin comprised of AlN particles and additives such as pigments or dyes (col 2 L 22-26 & col 5 L 49-51). The pigments or dyes is specifically carbon black material (col 7 L 13). The resin material has a dielectric constant of less than 10 (col 4 L 39).

The thermosetting resin is an epoxy resin which can be bisphenol epoxy resin, phenol epoxy novolac, or cresol epoxy novolac resins (col 5 L 18-22).

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Howard is silent about the $\tan\delta$ value, since Howard uses the same thermosetting resin as claimed by the applicant, inherently Howard's encapsulant possesses the same $\tan\delta$ value.

4. Claims 1-3 and 5 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Hsiao et al (US 5292688).

Hsiao teaches an encapsulant (7) (typo in description) which is used for bonding a semiconductor chip (1) to a substrate (2).

The semiconductor chip is encapsulated (or embedded) by the encapsulating composition (7) (see Fig.). The encapsulating composition (7) is comprised of an epoxy resin and an inorganic filler (col 5 L 1-5, 7-8 & col 4 L 63-65).

The encapsulant has a dielectric constant of less than 5.0 (col 6 L 23-24). The composition further comprises of an organic dye in an amount of less than about 0.2%. such dye can be a blue tone or a carbon black (col 5 L 58-62).

Since Hsiao discloses the same material used as the claimed invention, it is inherent that Hsiao's encapsulant also possesses the same $\tan\delta$ value.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howard (US 5589714) or Hsiao et al (US 5292688) further in view of Thomas (US 5828126) or Lin et al (US 5468999).

Both Howard and Hsiao disclose an encapsulating material in which an electronic component is embedded. However and Hsiao do not however teach a structure having a cavity or opening in which the electronic component resides and that the encapsulating material is used to fill the cavity or opening.

Both Thomas and Lin disclose a multilayer structure comprised of a base substrate and a build up layer. The build up layers are made of wiring layers and insulating layers in an alternate manner (see Thomas 14a,14b,16a,16b and 24,26,28; and Lin 18, 14, 16).

A cavity is formed in the build up layers, wherein an electronic component is formed within. An epoxy resin encapsulant is used to fill the cavity (Thomas col 6 L 24-26, Lin col 5 L 25-27).

In view of the prior art teachings, one skill in the art would use Howard or Hsiao's encapsulating material over a component formed within a cavity because such structure is well known in the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (703) 308-2418. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (703) 308-3822. The fax phone

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numbers for the organization where this application or proceeding is assigned are (703) 872-9604 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Cathy Lam
Primary Examiner
Art Unit 1775

cfl
September 25, 2002